Improved Emission Inventories Through Advances in Methods and Models

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Emission inventories are the foundation of cost-effective air quality management strategies. Therefore, it is the U.S. Environmental Protections Agency's (U.S. EPA) goal to progress toward an emission inventory that includes all significant emissions, from all sources, for all time periods, in all areas, with quantified uncertainties, and is accessible to all in a timely manner. In addition, the emission inventory must be complete, accurate, timely, transparent, and affordable. The general approach is to identify the largest uncertainties that can impact model outputs and associated strategy development and then conduct focused research to improve the underlying tools and techniques for completing and processing emission inventories. The research and development activities conducted to enhance emissions data and estimation techniques have increased the quality of the emission inventories used to meet these goals. Over the last five years, the research conducted has advanced the nation's capability to quantify biogenic emissions, characterize ammonia emissions and emission patterns, develop more refined estimates of mobile source emissions that consider the influence of operating mode, determine the specific species emitted from a variety of sources, and characterize fire emissions, as well as measure and characterize hazardous air pollutants. The outputs from this research have significantly improved the inputs used for air quality models that project future concentrations of ambient pollutants and helped identify the sources responsible for contributing to the elevated pollutant levels. The emission inventory research program is positioned to address the recommendations from the National Research Council, the Clean Air Act Advisory Committee, and the NARSTO Emission Inventory Assessment. These future directions include addressing priority source category testing needs, improving speciation estimates, improving and developing new tools, quantifying and reporting uncertainty, increasing inventory compatibility and comparability, improving user accessibility, improving timeliness, and assessing and improving emission projection techniques. From these endeavors, uncertainties in emission inventories will be reduced that enable improvements in policy and regulatory strategies to address ozone, particulate matter, hazardous air pollutants, regional haze, and global climate change.